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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|--------------------------|
| 10/069,058 | 08/27/2002 | Thierry Barge | 4747-4600 | 9030 |
| 28765 | 7590 | 05/03/2005 | EXAMINER | |
| WINSTON & STRAWN LLP 1700 K STREET, N.W. WASHINGTON, DC 20006 | | | | PIZARRO CRESPO, MARCOS D |
| | | ART UNIT | | PAPER NUMBER |
| | | 2814 | | |

DATE MAILED: 05/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|--------------------------|---------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 10/069,058 | BARGE ET AL. |
| | Examiner | Art Unit |
| | Marcos D. Pizarro-Crespo | 2814 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 28 March 2005.
 2a) This action is FINAL. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 28-52 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) 28-40 is/are allowed.
 6) Claim(s) 41-44 and 46-52 is/are rejected.
 7) Claim(s) 45 is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ |

Attorney's Docket Number: 4747-4600

Filing Date: 8/27/2002

Claimed Foreign Priority Date: 8/17/2000 (371 PCT/FR00/02330)
8/20/1999 (FR 99/10667)

Applicant(s): Thierry Barge, et al.

Examiner: Marcos D. Pizarro-Crespo

DETAILED ACTION

This Office action responds to the amendment filed on 3/28/2005.

Acknowledgment

1. The amendment filed on 3/28/2005, responding to the Office action mailed on 1/31/2005, has been entered. The present Office action is made with all the suggested amendments being fully considered. Accordingly, pending in this Office action are claims 28-52.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 41, 42, 46, 47, and 49-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Malik (US 2002/0173872), Maszara and Van Zant.

5. Regarding claim 41, Malik shows (see, e.g., fig. 1A and par. 0053) most aspects of the instant invention including a process for treating microelectronic or optoelectronic substrates **12** that have a working layer **10** with a free surface thereof, which process comprises annealing the substrate **12** under a reductive atmosphere to assist in smoothing the free surface, and then chemical mechanical polishing of the free surface to prepare it for further processing (see, e.g., par. 0054).

Malik, however, fails to specify how much substrate is removed during the polishing step. However, the claimed removed thickness will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such thickness is critical. "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the workable ranges by routine experimentation". *In re Aller*, 220 F.2d 454,456,105 USPQ 233, 235 (CCPA 1955).

Maszara (see, e.g., pp.130/ll.38-39), for example, removes a thickness of a portion of a working layer by polishing, and teaches that said polishing is subject to optimization. Exemplary measurements of the loss of film thickness are about 600-700 angstroms. Van Zant (see, e.g., pp.63/ll.20-26), on the other hand, teaches that the

thickness of the removed portion of the working layer is determined based on the initial free-surface topography such that a substantially planar surface is formed.

Since the applicant has not established the criticality (see next paragraph) of the thickness of the working layer that is removed by polishing, and since similar thicknesses have been removed in similar processes in the art, it would have been obvious to one of ordinary skill in the art to use these values in the process of Malik.

CRITICALITY

6. The specification contains no disclosure of either the critical nature of the claimed removed thickness or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

7. Regarding claim 42, Malik (see, e.g., par. 0053) teaches that the reductive atmosphere comprises hydrogen.

8. Regarding claim 46, Malik (see, e.g., par. 0053) teaches the process further comprising conducting one or more heat treatments of the substrates as the further processing.

9. Regarding claim 47, Malik (see, e.g., par. 0053) teaches the process further including a step of oxidizing the working layer after polishing.

10. Regarding claim 49, Malik (see, e.g., par. 0053) teaches the process further comprising annealing the substrate after the polishing step in order to improve the qualities of the working layer.

11. Regarding claim 50, Malik (see, e.g., par. 0028) teaches that the process further comprises a step wherein the working layer is provided by implanting atoms into a wafer to form a weakened atom implantation zone that defines the working layer, bonding the

wafer to the substrate and then detaching the working layer from the wafer along the weakened zone.

12. Regarding claims 51 and 52, Malik's working layer is made of silicon (see, e.g., par. 0030).

13. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Malik/Maszara/Van Zant in view of Kobayashi (US 6531416).

14. Regarding claim 43, Malik/Maszara/Van Zant shows most aspects of the instant invention (see paragraph 5 above), except for the annealing temperature. Kobayashi, on the other hand, teaches that a temperature between 1200-1230°C will significantly decrease the COP density of Malik's working layer.

It would have been obvious at the time of the invention to one of ordinary skill in the art to use an annealing temperature between 1200-1230°C in the method of Malik/Maszara/Van Zant, as suggested by Kobayashi, to decrease the COP density of the working layer.

15. Claims 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Malik/Maszara/Van Zant in view of Maleville (US 6403450).

16. Regarding claim 44, Malik/Maszara/Van Zant shows most aspects of the instant invention (see, e.g., paragraph 5 above), except for the process further comprising a step of oxidizing the working layer prior to polishing to provide at least a portion of the free surface as an oxide. Maleville, on the other hand, teaches that doing so increases the effectiveness of the polishing step by largely reducing the roughness of the working layer before polishing.

It would have been obvious at the time of the invention to one of ordinary skill in the art to include in the process of Malik/Maszara/Van Zant a step of oxidizing the working layer prior to polishing, as suggested by Maleville, to increase the effectiveness of the polishing step.

17. Regarding claim 45, Maleville (see, e.g., col.7/II.3-7) teaches the method further comprising a step of removing a portion of the oxide prior to annealing.

18. Claims 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Malik in view of Maleville.

19. Regarding claim 48, Malik shows (see, e.g., fig. 1A) most aspects of the instant invention including a process for treating microelectronic or optoelectronic substrates that have a working layer with a free surface thereof, which process comprises:

- ✓ Annealing the substrate under a reductive atmosphere to assist in smoothing the free surface (see, e.g., par. 0053)
- ✓ Chemical-mechanical polishing the free surface to prepare it for further processing (see, e.g., par. 0054)
- ✓ Oxidizing the working layer after polishing to provide at least a portion of the free surface as an oxide (see, e.g., par. 0053)

wherein the oxidizing is carried out to form a protective oxide on the working layer.

Malik, however, fails to shows a step of subjecting the substrate to at least one further heat treatment while the working layer is protected by the oxide. Maleville (see, e.g., col.7/II.1-7) teaches doing so to heal the defects generated during the oxidation step.

It would have been obvious at the time of the invention to one of ordinary skill in the art to include in Malik's method a step of heat treating the substrate while the working layer is protected by the oxide, as suggested by Maleville, to heal the defects generated during the oxidation step.

Allowable Subject Matter

20. Claims 28-40 are allowed.
21. Claim 45 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

22. The applicants argue:

The applicants have found that removing only 200-400 Å of the substrate by CMP after an annealing step is sufficient to bring the roughness value to a satisfactory level (see, e.g., spec./pp.16//I.27-pp.27//I.2). Surprisingly, it was discovered that by using an annealing operation before CMP, not only was there an improvement in the quality of the working layer, but most harmful effects of the CMP were avoided (see, e.g., spec./pp.3//I.1-8). One result is that production can be increased (see, e.g., pp.3//I.11-14). Further, it was surprising to find the removing only 200-400 Å of the substrate does not adversely affect the uniformity of the thickness of the substrate (see, e.g., spec./pp.3//I.14-18). For these reasons the removal of the thickness is critical to achieving the unexpected benefits of the invention. The applicants therefore traverse the statement that the present specification lacks disclosure of the critical nature of the claimed removed thickness or any unexpected results. Claim 41 is therefore patentably distinct over the cited art.

The examiner responds:

Applicants' statements that a satisfactory roughness, an improved layer quality, an avoidance of most harmful effects, an increased production, and a uniform thickness are achieved by removing 200-400 Å of the substrate, fail to overcome the rejection of claim 41. To be of probative value, applicants' assertion should be supported by actual proof. The MPEP gives guidelines on how to demonstrate the criticality of a claimed

range. See, e.g., MPEP§716.02(d). As explained therein, the applicants should compare a sufficient number of tests both inside and outside the claimed range to show criticality of the claimed range. The evidence relied upon should establish "that the differences in results are in fact unexpected and unobvious and of both statistical and practical significance." *Ex parte Gelles*, 22 USPQ2d 1318, 1319 (Bd. Pat. App. & Inter. 1992). The applicants, however, have failed to present any data showing that removing 200-400 Å of the substrate surface is critical. Due to the absence of said data, the examiner concludes that applicants' assertion that removing the claimed thickness from the substrate surface is critical constitutes mere argument. Therefore, since, the applicants have failed to established the criticality of the thickness of the working layer that is removed, and since similar thicknesses have been removed in similar processes in the art (see, e.g., paragraph 5 above), and since the cited art shows all other limitations in the claim, claim 41 stands rejected under Malik/Maszara/Van Zant (see, e.g., paragraphs 5-6 above).

Conclusion

23. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).
24. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

25. Papers related to this application may be submitted directly to Art Unit 2814 by facsimile transmission. Papers should be faxed to Art Unit 2814 via the Art Unit 2814 Fax Center. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2814 Fax Center number is **(703) 872-9306**. The Art Unit 2814 Fax Center is to be used only for papers related to Art Unit 2814 applications.

26. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Marcos D. Pizarro-Crespo** at **(571) 272-1716** and between the hours of 9:30 AM to 8:00 PM (Eastern Standard Time) Monday through Thursday or by e-mail via Marcos.Pizarro@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on **(571) 272-1705**.

27. Any inquiry of a general nature or relating to the status of this application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair>-

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direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

28. The following list is the Examiner's field of search for the present Office Action:

| Field of Search | Date |
|--|-----------|
| U.S. Class / Subclass(es): 438/4,406,455-459,471-477,692,795-799,974,977; 117/2; 156/610 | 4/19/2005 |
| Other Documentation: | |
| Electronic Database(s): EAST (USPAT, EPO, JPO, PGPub) | 4/19/2005 |

Marcos D. Pizarro-Crespo

Patent Examiner

Art Unit 2814

571-272-1716

marcos.pizarro@uspto.gov**Howard Weiss**

Primary Examiner

Art Unit 2814